



## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

U.S. Environmental Protection Agency  
Office of Air Quality Planning and Standards  
Air Quality Assessment Division  
Ambient Air Monitoring Group

109 T.W. Alexander Dr., Research Triangle Park, NC 27711

**March 28, 2019**

**To:** Specialty Gas Producers

**From:** Solomon Ricks, EPA – OAQPS Protocol Gas Verification Program Lead  
*Solomon Ricks 4/9/2019*

Bob Wright, EPA – ORD Air and Energy Management Division  
*Bob S. Wright 4/10/2019*

**Subject:** Request for Long-Term Stability Data for NO<sub>2</sub> Gas Mixtures

In October 2017, the attached memoranda were sent to EPA Protocol Gas vendors and to EPA Regions, States, and local agencies concerning NO<sub>2</sub> EPA Protocol Gases. There is a need for such calibration gases because of the recent development of direct-reading NO<sub>2</sub> ambient air quality analyzers and their use for regulatory measurements. Current EPA guidance suggests that these analyzers should be calibrated using gas-phase titration via the use of the EPA Protocol Gas NO. Currently, NO<sub>2</sub> gas mixtures could be used for quality control checks between such calibrations, although there are concerns about their long-term stability. Because of this stability issue, the EPA has not included NO<sub>2</sub> gas mixtures among those gas mixtures that can be certified as EPA Protocol Gases using the EPA Traceability Protocol for the Assay and Certification of Gaseous Calibration Standards (see <https://www.epa.gov/air-research/epa-traceability-protocol-assay-and-certification-gaseous-calibration-standards>).

The EPA expects that states may choose to deploy direct-reading NO<sub>2</sub> analyzers at some of their Photochemical Assessment Monitoring Station (PAMS) locations. It also expects that more state and local agencies may deploy these analyzers into other existing ambient monitoring stations. The calibration of these analyzers would be easier if accurate and stable NO<sub>2</sub> EPA Protocol Gases were available. Accuracy requires the availability of NIST-traceable reference standards with which to assay candidate standards. Stability requires the availability of cylinders in which NO<sub>2</sub> gas mixtures do not decay.

NIST-traceable NO<sub>2</sub> reference standards are currently available from VSL, the Dutch equivalent of NIST. An updated Declaration of Equivalency has been signed by both organizations. Additionally, NIST is in the process of developing a new suite of NO<sub>2</sub> primary standards and is doing stability testing on its SRM 2660 (i.e., 100 ppm NO<sub>x</sub> in air). NIST will attempt to dilute down to lower levels of NO<sub>2</sub> in cylinders.

The remaining roadblock to certifying NO<sub>2</sub> as an EPA Protocol Gas is establishing an understanding of its long-term stability. While VSL has shown that its NO<sub>2</sub> Primary Reference Materials (PRMs) in Luxfer SGS™ aluminum cylinders are reasonably stable (i.e., one year for 10 to 100 ppm), the EPA is not aware of corresponding long-term stability data for commercially-produced NO<sub>2</sub> gas mixtures in SGS™ or other passivated aluminum cylinders. The EPA will need such data before it can include NO<sub>2</sub> gas mixtures among those gas mixtures that can be certified as EPA Protocol Gases. The EPA would

like to get data from a wide variety of sources to assess the capability of the whole specialty gas industry, rather than just for isolated producers. The EPA needs and intends to treat all producers equally without favoritism. Please send such data at your earliest convenience to Solomon Ricks (ricks.solomon@epa.gov, 919-541-5242) or Bob Wright (wright.bob@epa.gov, 919-541-4502).

The EPA plans to purchase VSL reference standards and direct-reading NO<sub>2</sub> analyzers to allow NO<sub>2</sub> gas mixtures to be verified as part of the ambient air Protocol Gas Verification Program (PGVP, see <https://www3.epa.gov/ttn/amtic/aapgvp.html>).